Claims

[c1] 1. A method of motion detection for a 3D comb filter video decoder, comprising:

sampling a composite video signal for obtaining a plurality of temprarily stored sampled data $F_m P_{x,y}$, wherein $F_m P_{x,y}$ represents a sampled data of a y^{th} pixel on an x^{th} line of an m^{th} frame in the composite video signal, and m, x, y are positive integers greater than or equal to 0; and

using $F_{m+1} P_{x,y}$, $F_m P_{x,y}$, $F_{m-1} P_{x,y}$, and $F_{m-2} P_{x,y}$ to determine a motion/still status of the composite video signal.

[c2] 2. The method of motion detection for a 3D comb filter video decoder of claim 1, wherein the step of determining the motion/still status of the composite video signal further comprises:

using $F_{m+1} P_{x,y}$, $F_m P_{x,y}$, $F_{m-1} P_{x,y}$, and $F_{m-2} P_{x,y}$ to calculate and obtain a plurality of max differences $MD_{x,y}$, wherein $MD_{x,y}$ represents a max difference of the y^{th} pixel on the x^{th} line;

averaging 4 max differences of the contiguous pixels selected to obtain a motion factor $MF_{x,y}$, wherein $MF_{x,y}$ represents a motion factor of the y^{th} pixel on the x^{th} line; and

detecting $MF_{x,y}$ to determine the motion/still status of the y^{th} pixel on the x^{th} line in the composite video signal.

[c3] 3. The method of motion detection for a 3D comb filter video decoder of claim 2, wherein when it is determined that the composite video signal is a signal for an NTSC system, the step of sampling the composite video signal uses a frequency which is 4 times the subcarrier frequency in the composite video signal to sample the signal, and the signal is sampled when the subcarrier phase is equal to 0, 0.5π, π, and 1.5π.

[c4] 4. The method of motion detection for a 3D comb filter video decoder of claim 3, wherein $MD_{x,y}$ is calculated based on an equation:

$MD_{x,y} = \mathrm{Max}\{|F_m P_{x,y} - F_{m-2} P_{x,y}|, |F_{m+1} P_{x,y} - F_{m-1} P_{x,y}|\}$.

[c5] 5. The method of motion detection for a 3D comb filter video decoder of claim

2, wherein when it is determined that the composite video signal is a signal for a PAL system, the step of sampling the composite video signal uses a frequency which is 4 times the subcarrier frequency in the composite video signal to sample the signal, and the signal is sampled when the subcarrier phase is equal to 0.25π, 0.75π, 1.25π, and 1.75π.

[c6] 6. The method of motion detection for a 3D comb filter video decoder of claim 5, wherein the step of calculating and obtaining $MD_{x,y}$ further comprises:

calculating and obtaining a plurality of luma differences $LD_{x,y}$, wherein $LD_{x,y}$ represents a luma difference of the y^{th} pixel on the x^{th} line, and is calculated based on an equation: $LD_{x,y} = | F_m P_{x,y} + F_{m-2} P_{x,y} - F_{m+1} P_{x,y} - F_{m-1} P_{x,y} |$;

calculating and obtaining a plurality of intermediate differences $IMD_{x,y}$, wherein $IMD_{x,y}$ represents an intermediate difference of the y^{th} pixel on the x^{th} line, and is calculated based on an equation:

$IMD_{i,2j-1} = Max\{| F_{m+1} P_{i,2j-1} - F_{m-2} P_{i,2j-1} |, | F_m P_{i,2j-1} - F_{m-1} P_{i,2j-1} |\}$;

$IMD_{i,2j} = Max\{| F_{m+1} P_{i,2j} - F_m P_{i,2j} |, | F_{m-1} P_{i,2j} - F_{m-2} P_{i,2j} |\}$; and

calculating and obtaining $MD_{x,y}$, which is calculated based on an equation:

$MD_{x,y} = a^* IMD_{x,y} + (1 - a)^* LD_{x,y}$;

wherein, a is a real number greater than 0 and less than 1, and i, j are positive integers.

[c7] 7. The method of motion detection for a 3D comb filter video decoder of claim 2, wherein the step of obtaining $MF_{x,y}$ further comprises:

averaging 4 max differences of the contiguous pixels selected to obtain a plurality of max differences $AMD_{x,h}$, wherein $AMD_{x,h}$ represents an average of max difference of a h^{th} pixel on the x^{th} line, h is a positive integer, and $AMD_{x,h}$ is calculated based on an equation:

$AMD_{x,h} = (MD_{x,h} + MD_{x,h+1} + MD_{x,h+2} + MD_{x,h+3}) / 4$; and

selecting a minimum from the averages of max difference to obtain a motion factor $MF_{x,y}$, wherein $MF_{x,y}$ represents a motion factor of the y^{th} pixel on the x^{th} line.

[c8] 8. The method of motion detection for a 3D comb filter video decoder of claim 7, wherein the step of selecting a minimum from the averages of max difference

to obtain $MF_{x,y}$ is based on an equation:
$MF_{x,y} = Min(AMD_{x,y}, AMD_{x,y-1}, AMD_{x,y-2}, AMD_{x,y-3})$.

[c9] 9. The method of motion detection for a 3D comb filter video decoder of claim 7, wherein the step of selecting a minimum from the averages of max difference to obtain $MF_{x,y}$ is based on an equation:
$MF_{x,y} = Min(AMD_{x,y}, AMD_{x,y-3})$.

[c10] 10. The method of motion detection for a 3D comb filter video decoder of claim 2, wherein the step of detecting $MF_{x,y}$ to determine the motion/still status of the y^{th} pixel on the x^{th} line in the composite video signal further comprises:
providing a threshold; and
comparing $MF_{x,y}$ with the threshold, and when $MF_{x,y}$ is greater than the threshold, it is determined that the y^{th} pixel on the x^{th} line in the composite video signal is in the motion status, otherwise, the y^{th} pixel on the x^{th} line in the composite video signal is in the still status.

[c11] 11. The method of motion detection for a 3D comb filter video decoder of claim 10, wherein the motion factors $MF_{x,y}$ are the motion factors of the m^{th} frame.